Cobra CB 19 DX4 EU
Service Manual

SPECIFICATIONS

1. GENERAL

Channels……………………..…………………….........................EU CH AM/FM 1W/4W
Frequency Range……………………………..………………………..26.565 to 27.99125 MHz
Temperature Range…………………..…………………………….….-10°C / +55°C
Input Voltage…………………………....………………………….......13.2VDC ±15%
Size…………………………………………….…………..………190(L) X 45(H) X 120(D) mm
Weight…………………………………………………..………………...Approx. 0.945 kg

2. RECEIVER

Receiving System…………………………………………………………...Super Heterodyne
Frequency………………………………………….….1st IF: 10.695 MHz, 2nd IF: 455 MHZ
Sensitivity……………………………………......….0.5 µV for 12 dB SINAD in FM mode Audio
Distortion…………………………………..……….……..……………Less Than 8% @ 1 KHz
Current Drain at standby……………………………….………………300 mA

3. TRANSMITTER

Output Power…………………………………………….…..……….MAX. 4W @ 13.2 V DC
Modulation…………………………………………….…..……………FM: 1.7 KHz / AM 65%
Frequency response……………………………………………….....From 400 Hz to 2.5 KHz
Output impedance…………………………………..……………… RF 50 ohm
MIN Current Drain…………………………………………………1500 mA

OPERATION INSTRUCTIONS

Having properly installed your batteries and hooked-up the antenna, you are now ready to operate your radio for optimum reception and voice transmission.

Turn the power “ON” with ON/OFF switch.

Set the desired channel in FM or AM.

Adjust the squelch control knob to reduce any undesirable background noise when no signal is being received. To do this, select a channel where no signal are present, or wait until signals cease on your channel. Then, rotate the squelch control knob clockwise to a point where the background noise disappears.

Note: When the squelch is set properly, the speaker will remain quiet until a signal is received. In order to receive weak signals, do not set the squelch too high.

Adjust the volume to the desired listening level.

To Transmit

Press and hold the push-to-talk button. Speak slowly and clearly in a normal voice two to three inches from the microphone. A built-in modulation control circuit will automatically adjust the microphone input level. There is no need to speak loudly.

To Receive

Release the push-to-talk button.

Note: Other operations mode see user manual.

THEORY OF OPERATIONS

TRANSMITTER

A. RF Amplification

The output of double AMP Q14 is fed through tuning IFT L8 to the base of pre driver AMP Q15. The output is then supplied through tuning circuit L9 to RF driver AMP Q16. The output of Q16 is supplied with tuning circuit L10 and C116,C67,C95 and goes to the base of final RF AMP Q17. The output of Q17 is supplied to the antenna through L-C tuning circuit.

B. Modulation Control

i. FM

The mic input is fed to mic audio amplifier IC which drives modulation varicap diode D403 in the VCO circuit. RV1 is used to limit the incoming modulation audio levels to inhibit over modulation.

ii. AM

Modulation signals are filtered with RC network and goes to the audio power AMP IC IC103 to make nominal signal level to achieve wanted modulation. To control incoming audio signal, diode D7 and corresponding ALC circuit is used to limit the incoming modulation.

C. Receiver

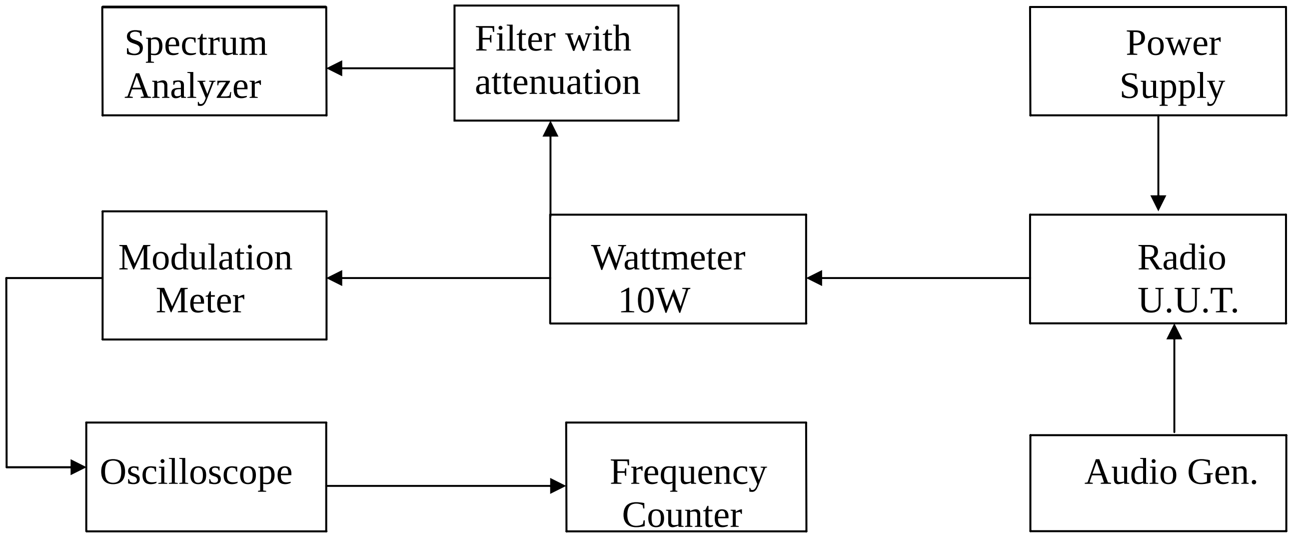
CB receiver is dual conversion super-heterodyne type with the first IF 10.695 MHz and second IF 455 KHz. Receiver is separated into two blocks, 1st IF section and 2nd IF section. The PLL synthesizer supplies first local frequency 37.26 ~ 38.686 MHz.(for EU) With the provided first local frequencies to Q2,Q3 mixes the incoming RF signal to generate first IF signal. Mixed signals were filtered with the XF1 (10.695 MHz) crystal filter and other tuning circuits. The filtered signal is then further mixed with the second local frequency of 10.24 MHz to generate the second IF. Output signal of mixer is filtered with CF1 (455 KHz ceramic filter). The 455 KHz signal from the 2nd IF filter was amplified and limits internally. After amplification the signals fed the quadrate detector loop L20. Then we can see the recovered audio signals on Pin 9 for FM of IC7. With the amplitude of recovered signals, Q10 serves as an audio amplifier. For AM signal, it will be passed through the filter CF1 and be induced to Q6, Q7 respective and detected to voice signal by D5.

TROUBLESHOOTING HINTS

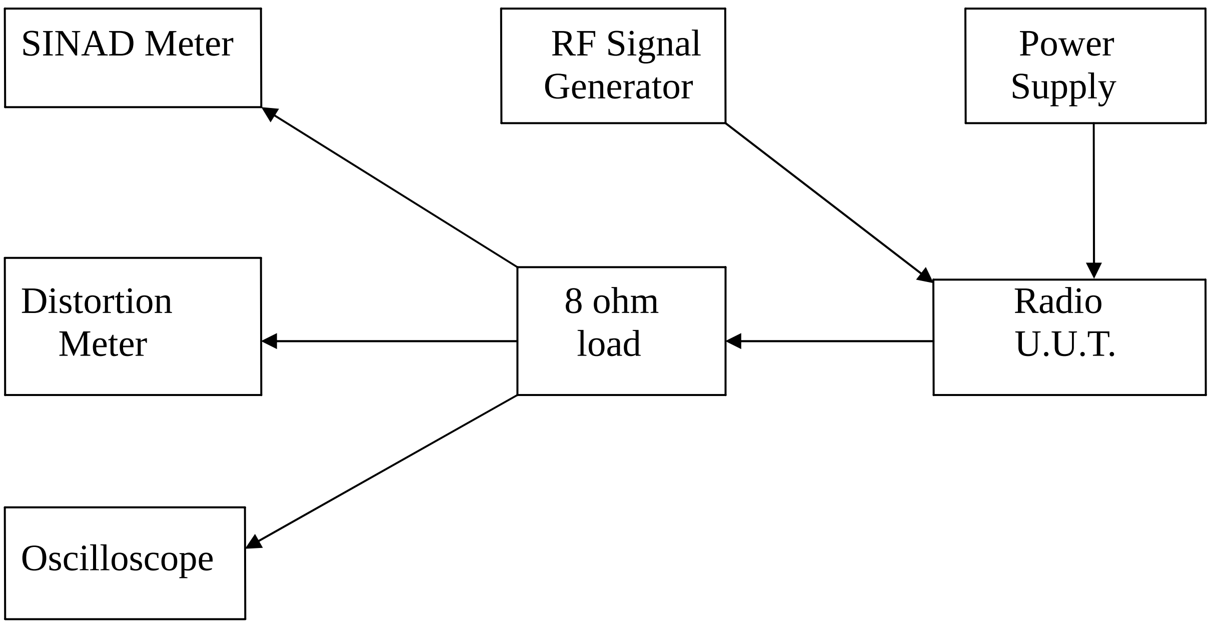
Symptom	Possible Causes	Remedy Suggestions
Unit does not work at all	• Defective power switch • Blown fuse • Broken DC power cord • Defective components	• Replace defective components
No output from speaker at all	• Defective external speaker jack • Poor connection on microphone connector • Defective push switch on microphone • Defective internal speaker • Defective VR1 and IC8	• Replace defective components
No noise on speaker	• Measure all the voltage of IC7 with voltage chart • Defective squelch circuit components (RV5, VR2, IC7)	• Replace defective components
Squelch does not work	• Defective VR2, RV5, IC3-D.	• Replace defective components. • Re-adjust Squelch sensitivity
No modulation	• Defective microphone. • Poor audio output and defective IC3. • Defective microphone connector components. • Defective ALC circuit D8, D9	• Replace defective components. • Re-adjust Tx modulation
LCD meter does not work	• Defective D11, D22 • Defective IC5. • Defective RV2. RV6	• Replace defective components. • Re-adjust RX meter display
LCD display does not work	• Defective RED wire fuse. • Defective LCD module	• Replace defective components.
Channel selector does not work	• Defective IC5.	• Replace defective components.
EMG CH9.19 does not work	• Defective IC5.	• Replace defective components.

TEST SETUP

A. TX test setup:



B. RX test setup:



Note: U.U.T. = device under test

ALIGNMENT PROCEDURE

VCO Voltage

1. Test point TP1 connect to the multi-meter， set UUT enter test mode. Use channel “UP” key to select CH41 (26.565MHz) of DE Band in FM mode.
2. Adjust IFT L17 for 1.0 ± 0.1V on the Multi-meter read，and then checking CH40 (27.99125MHz) of UK Band should be less than 3.8V.

RX Alignment

Audio Level

1. UUT set to FM mode CH19， output of RF signal generator connect to TP2. Audio dummy load connect to EXT. Speaker. (@8Ω load)
2. Set RF S.S.G Freq.: 10.695MHz， Mod.: ±1.2KHz， Fmod.: 1KHz, Output level:1mV.
3. Squelch Volume set to minimum position, volume control set to around middle position.
4. Adjust IFT L20 for maximum audio output amplitude.

Sensitivity

1. UUT set to FM mode CH22, output of RF signal generator connect to TP5 (Antenna).
2. Set RF S.S.G Freq.: 27.225MHz, Mod.: ±1.2KHz， Fmod.: 1KHz, Output level:0.5uV.
3. Adjust the volume control for 2V output on distortion meter read.
4. Adjust L2 & L3 for more than 12dB at SINAD meter.

T-Squelch Sensitivity

1. UUT set to AM CH22, output of RF signal generator to the antenna input terminal.
2. Set RF S.S.G Freq.: 27.225MHz， Mod.: 60%， Fmod.: 1KHz, Output level: -47dBm.
3. Volume control and Squelch control set to maximum position.
4. Adjust the RV5 to mute the speaker, then slowly turn RV5 to a position that the audio output on the speaker just appears from no output. Turn the RF S.S.G. output level to -57dBm, the audio must be off from the speaker.

RX Signal Meter Display

1. UUT set to AM CH22，output of RF signal generator to antenna input terminal. RF Gain volume at maximum. Power switch turn on.
2. Turn the RF S.S.G output for 100uV without modulation.
3. Adjust RV6 for 9 characters displayed at the RX signal strength of the LCD.
4. Turn the RF S.S.G level output increase 30dB, the RX signal strength should up to +30 position.

TX Alignment

TX Output Power and Frequency

1. UUT set to FM EU CH19, Antenna connect to the RF power-meter input terminal.
2. Set UUT to TX mode, adjust the IFT L8 and L9 for TX power output maximum, and then adjust the RV4 check the output TX power for 3.5W.
3. Change to channel to EU CH19, Adjust the trimmer capacitor CT1 to 27.185000 +/- 500Hz on frequency counter.

TX Modulation Deviation

1. UUT set to FM EU CH19, input of power-meter to antenna input terminal. Couple to MIC socket from the audio frequency signal generator output terminal.
2. Set audio frequency signal generator @ FREQ.: 1000Hz, Output level: 50mVrms.
3. Set UUT to TX mode, adjust RV1 for 1.5KHz deviation on modulation meter.
4. Set UUT to AM mode; Set audio frequency signal generator @ FREQ.: 1000Hz, Output level: 50mVrms.
5. Set UUT to TX mode, adjust RV3 for 65% deviation on modulation meter.

VOLTAGE CHART

Transistor	Pin	TX	RX	Transistor	Pin	TX	RX
Q2	E	0	0	Q32	E	0	0
	C	0	0.8		C	0	6.0
	B	0	6.7		B	3.5	0
Q2	E	0	0	Q37	G	0	0
	C	0	0.8		S	0.5	7.9
	B	0	6.7		D	2.8	0
Q14	E	1.2	0	Q40	G	0.7	0.9
	C	8.0	0		S	0	0
	B	2.0	0		D	0	6.1
Q16	E	0	0				
	C	8.5	3.0				
	B	1.0	0				
Q17	E	0	0				
	C	13.2	2.0				
	B	13.0	0				
Q18	E	0	7.3				
	C	0	0				
	B	0.5	7.9				
Q19	E	8.1	8.10				
	C	7.9	0				
	B	7.3	7.9				
Q28	E	6.1	6.1				
	C	8.1	8.1				
	B	6.8	6.8				

Diode	Pin	TX	RX	Diode	Pin	TX	RX
D1	A	0.5	7.1	DZ1	A	0.4	0.4
	K	0	6.1		K	8.7	8.7
D2	A	0.5	7.1	D16	A	2.5	0
	K	0	6.1		K	2.2	2.2
D5	A	0	0	D19	A	7.9	0
	K	0	0		K	7.3	0
D6	A	10.6	2.8				
	K	9.7	2.8				
D10	A	0	0				
	K	12.8	13.2				
D14	A	7.9	0				
	K	7.2	0.6				

IC4 PIN	TX	RX	PIN	TX	RX
1	4.2	4.2	9	3.6	3.6
2	4.7	4.7	10	4.0	4.0
3	1.0	1.7	11	4.5	4.5
4	0	0	12	0.7	0.7
5	5.0	5.0	13	0	0
6	0	0	14	0	0
7	0	0	15	4.7	4.7
8	0	0	16	4.1	4.1

IC3 PIN	TX	RX	PIN	TX	RX
1	3.2	3.2	8	0	1.8
2	3.2	3.2	9	0	1.8
3	3.2	3.2	10	0	1.8
4	7.9	7.9	11	0	0
5	3.7	3.7	12	0	0
6	3.9	3.9	13	0	1.7
7	3.9	3.9	14	0	0

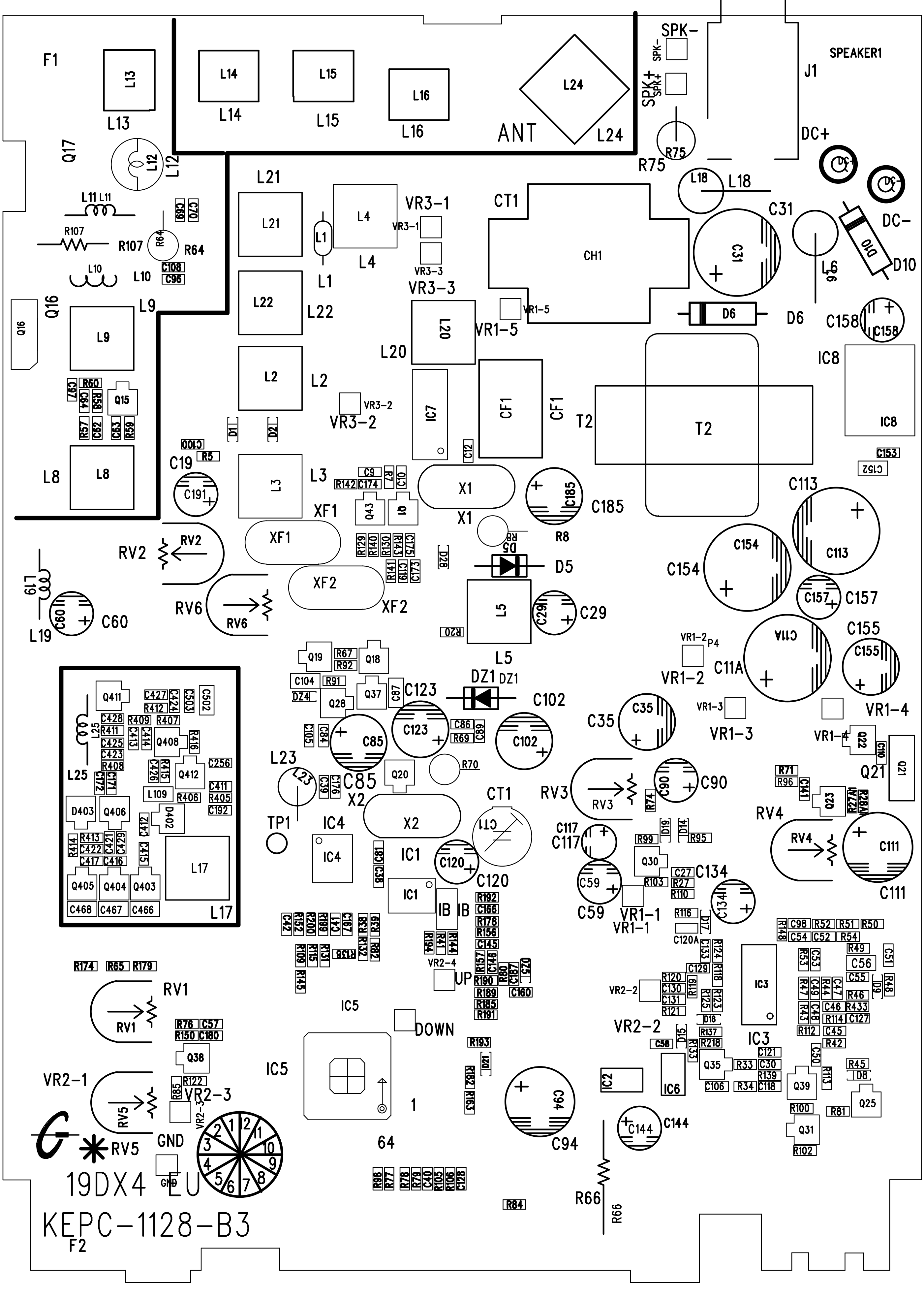
IC8 PIN	TX	RX	PIN	TX	RX
1	1.0	1.0	4	6.3	6.3
2	0.8	0.8	5	13.2	13.2
3	0	0			

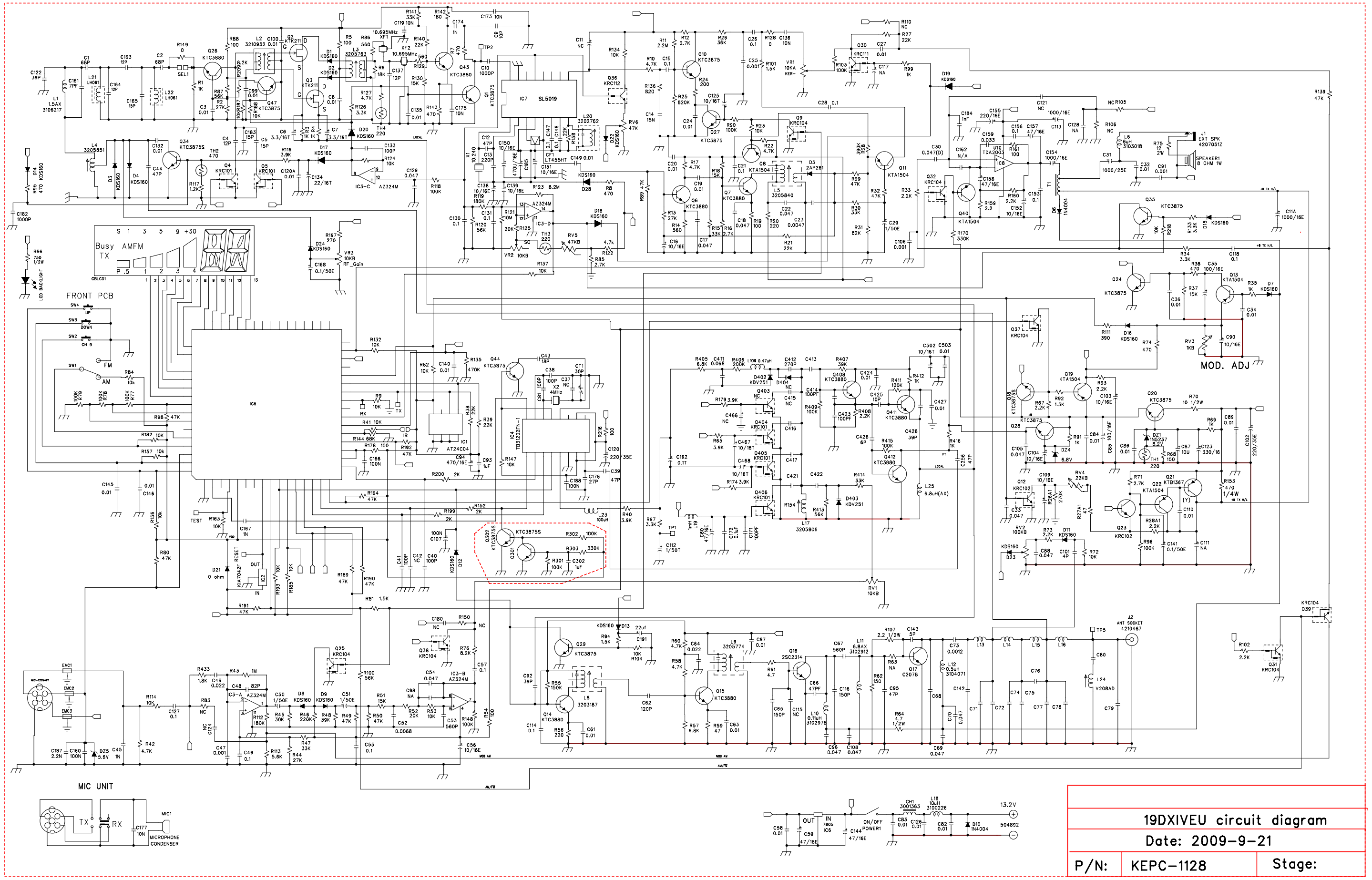
IC6 PIN	TX	RX	PIN	TX	RX
1	5	5	3	13.2	13.2
2	0	0	-	-	-

IC7 PIN	TX	RX	PIN	TX	RX
1	0	5.0	9	0	1.6
2	0	4.5	10	0	0
3	0	4.5	11	0	5.0
4	0	4.5	12	0	0
5	0	4.0	13	0	1.8
6	0	4.0	14	0	0
7	0	4.0	15	0	0
8	0	5.0	16	0	1.8

IC5 PIN	TX	RX	PIN	TX	RX
1	0	0	33	3.0	3.0
2	1.4	1.4	34	3.5	3.5
3	2.3	2.3	35	3.5	3.5
4	0	0	36	0	0
5	4.9	4.9	37	1.2	1.2
6	0.1	0.1	38	1.2	1.2
7	0	0	39	0	0
8	4.2	4.2	40	1.2	1.2
9	3.2	3.2	41	1.5	1.5
10	5.0	5.0	42	1.5	1.5
11	0	0	43	1.5	1.5
12	0	0	44	2.6	2.6
13	0	0	45	2.6	2.6
14	4.9	0	46	2.6	2.6
15	0	0	47	2.6	2.6
16	5.0	5.0	48	2.6	2.6
17	5.0	5.0	49	2.6	2.6
18	5.0	5.0	50	2.6	2.6
19	5.0	5.0	51	2.6	2.6
20	0	0	52	2.6	2.6
21	0	0	53	2.6	2.6
22	5.0	5.0	54	2.6	2.6
23	2.0	0	55	2.6	2.6
24	0	0	56	4.5	4.5
25	0	0	57	3.2	3.2
26	4.8	4.8	58	1.8	1.8
27	0.3	4.8	59	1.8	1.8
28	0.4	0	60	2.6	2.6
29	0	0	61	0.1	0.1
30	0	0	62	0	0
31	3.5	0	63	0	0
32	3.5	3.5	64	0	0

SILKSCREEN TOP




FRONT PCB
MIC UNIT
MOD. ADJ.
19DXIVEU circuit diagram
Date: 2009-9-21
P/N: KEPC-1128
Stage:

SILKSCREEN BOTTOM

